

# STATE OF COLORADO

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Dedicated to protecting and improving the health and environment of the people of Colorado

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Colorado Department  
of Public Health  
and Environment

August 22, 2011

Ms. Bonnie Lavelle  
Remedial Project Manager  
EPA Region 8  
595 Wynkoop Street  
8EPR-SR  
Denver, Colorado 80202-1129

Subject: July 26, 2011 Response Action Work Plan to Extract Additional Groundwater from Upgradient of MW77-WD, Lowry Landfill Superfund Site, received July 26, 2011.

Dear Ms. Lavelle:

The Colorado Department of Public Health and Environment, Hazardous Materials and Waste Management Division (the Division) reviewed the subject document and developed the following comments. The Division considers these comments preliminary because EPA has indicated they will request a revised work plan.

1. All available physical and chemical data collected from Wells MW170-WD through MW173-WD, and data collected in 2011 from MW77-WD, should be provided with the revised work plan, even if these data have not yet been validated and must be qualified as such. Specifically, lithologic logs from the four new wells should be provided along with available nitrate, 1,4-dioxane, volatile organic compounds (VOCs), and specific conductance data from all five wells.
2. Simultaneous evaluation of multiple working hypotheses (i.e., residual and active contaminant source hypotheses) may be appropriate during implementation of the revised work plan. The following represent specific suggestions to be considered during this simultaneous evaluation:
  - a. Nitrate is a useful groundwater tracer and compliance indicator parameter and should be included as an analyte for all monitoring wells sampled under the revised work plan. Isotopic analysis of nitrogen and oxygen may help resolve questions related to the origin of elevated and increasing concentrations of nitrate in groundwater in the vicinity of the former drum storage pad.

- b. Three additional monitoring wells are proposed as follows:
- i. One new Weathered Dawson (WD) monitoring well at or immediately west of former temporary piezometer TPZ-7; and
  - ii. Two new Unweathered Dawson (UD) monitoring wells, one adjacent to MW77-WD and the second paired with the new proposed WD well next to or immediately west of former temporary piezometer TPZ-7, near the south corner of the former drum storage pad.

These three proposed wells are justified based on the following lines of evidence, which include potentiometric data and interpretations, lithologic data, surface geophysical data, and recent and historic groundwater quality data.

1. Recent (October 2010) WD and UD potentiometric data are consistent with a possible lateral and/or vertical migration pathway from south of the former drum storage pad to compliance wells MW77-WD, MW62-WD, B326-WD, and B326-UD (see enclosed modified Figures 4.15 and 4.17);
2. Lithologic data presented on hydrogeological profiles on Plates A-2 and A-6 from the 2005 Groundwater Monitoring Plan at former temporary piezometer TPZ-6 show "coarse sands associated with channel sand deposits" both above and below the "base of Weathered Dawson" in the vicinity of the former drum storage area;
3. Surface resistivity geophysical interpretations provided on the easternmost surface resistivity geophysical line on Plates A-2 and A-6 ("100 foot depth 5-60 ohm-m" and "200 foot depth 5-20 ohm-m") from the 2005 Groundwater Monitoring Plan are consistent with coarse sands or gravels occurring both above and below the "base of Weathered Dawson" in the vicinity of former temporary piezometer TPZ-7 and former UD monitoring well B-215. Depth to base of WD at TPZ-7 and B-215 is 33 and 32 feet below land surface, respectively. Although the easternmost geophysical line is not coincident with the location of MW77-WD, MW77-WD was selected as a compliance well because it has "high purge/quick recovery rates" (page 11 of Appendix D to 2005 Groundwater Monitoring Plan). This evidence suggests channel sands occur beneath the base of WD, justifying evaluation of UD groundwater quality in this area;
4. Chemical compliance monitoring data from WD wells MW77-WD, MW62-WD, and B326-WD indicates 1,4-dioxane and nitrate

have, or are migrating (i.e., residual versus active migration hypotheses, respectively) in the WD to these locations. Additionally, the volatile organic compound 1,1-dichloroethane (1,1-DCA) has migrated to WD well MW77-WD (see enclosed modified Figure 4.15);

5. Chemical compliance monitoring data from UD well B326-UD indicates 1,4-dioxane and nitrate have, or are migrating (i.e., residual versus active migration hypotheses, respectively) in the UD to this location (see enclosed modified Figure 4.17); and
  6. Historic chemical groundwater quality data from former UD monitoring well B-215 in 1988 included 1,1-DCA at a concentration of 25.4 micrograms per liter ( $\mu\text{g/L}$ ), trichloroethene (TCE) at 5.39  $\mu\text{g/L}$  and 1,1,1-trichloroethane (TCA) concentrations ranging from 15.5  $\mu\text{g/L}$  to 102  $\mu\text{g/L}$ . The current performance standards for 1,1-DCA, TCE, and TCA are 7, 5, and 200  $\mu\text{g/L}$ , respectively. 1,1-DCA was quantified at former UD monitoring well B-215 in 1998, and more recently in downgradient WD compliance Well MW77-WD at concentrations above the performance standard. Additionally, although no 1,4-dioxane data were available from former UD monitoring well B-215 prior to its abandonment in 1989, as a general "rule of thumb," TCA is often cited as being a source of 1,4-dioxane.
3. Although not the subject of this work plan, similar to the active migration concerns around the east end of the NBBW to compliance wells MW77-WD, MW62-WD, B326-WD, and B326-UD, the Division is also concerned about the possibility of active lateral contaminant migration and bypass around the west end of the North Boundary Barrier Wall (NBBW) to the vicinity of Weathered Dawson Compliance Well B-313.

Additionally, as we discussed during our August 16, 2011 meeting with EPA, attempting to maintain a zone of containment on the north side of the NBBW via potable water recharge is inconsistent with the NBBW design (see enclosed NBBW profiles) and may also be contributing unnecessarily to the hydraulic load entering the water treatment plant and Publicly Owned Treatment Works, which are nearing capacity.

Please don't hesitate to contact me at 303/692-3453 if you have any questions or would like to discuss any of this information.

Sincerely,



Lee J. Pivonka

Federal Facility Remediation & Restoration Unit

Remediation Program  
Hazardous Materials and Waste Management Division

Enclosure: Modified versions of North Boundary Barrier Wall profiles and Figures 4.15 and 4.17 from the March 30 Remedial Action (RA) and Operations and Maintenance (O&M) Status Report, July through December 2010.

cc: Andrew Schmidt, USEPA Region VIII

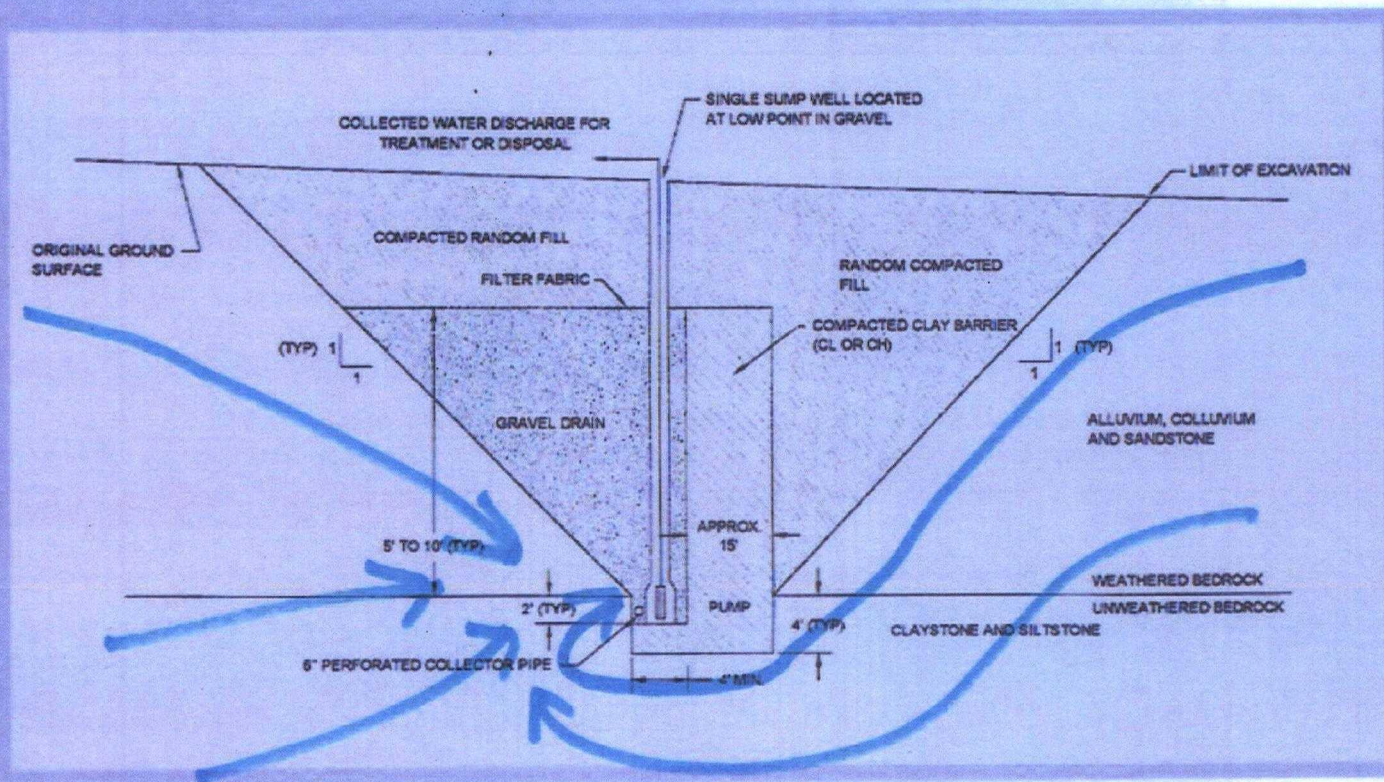
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# NBBW Design

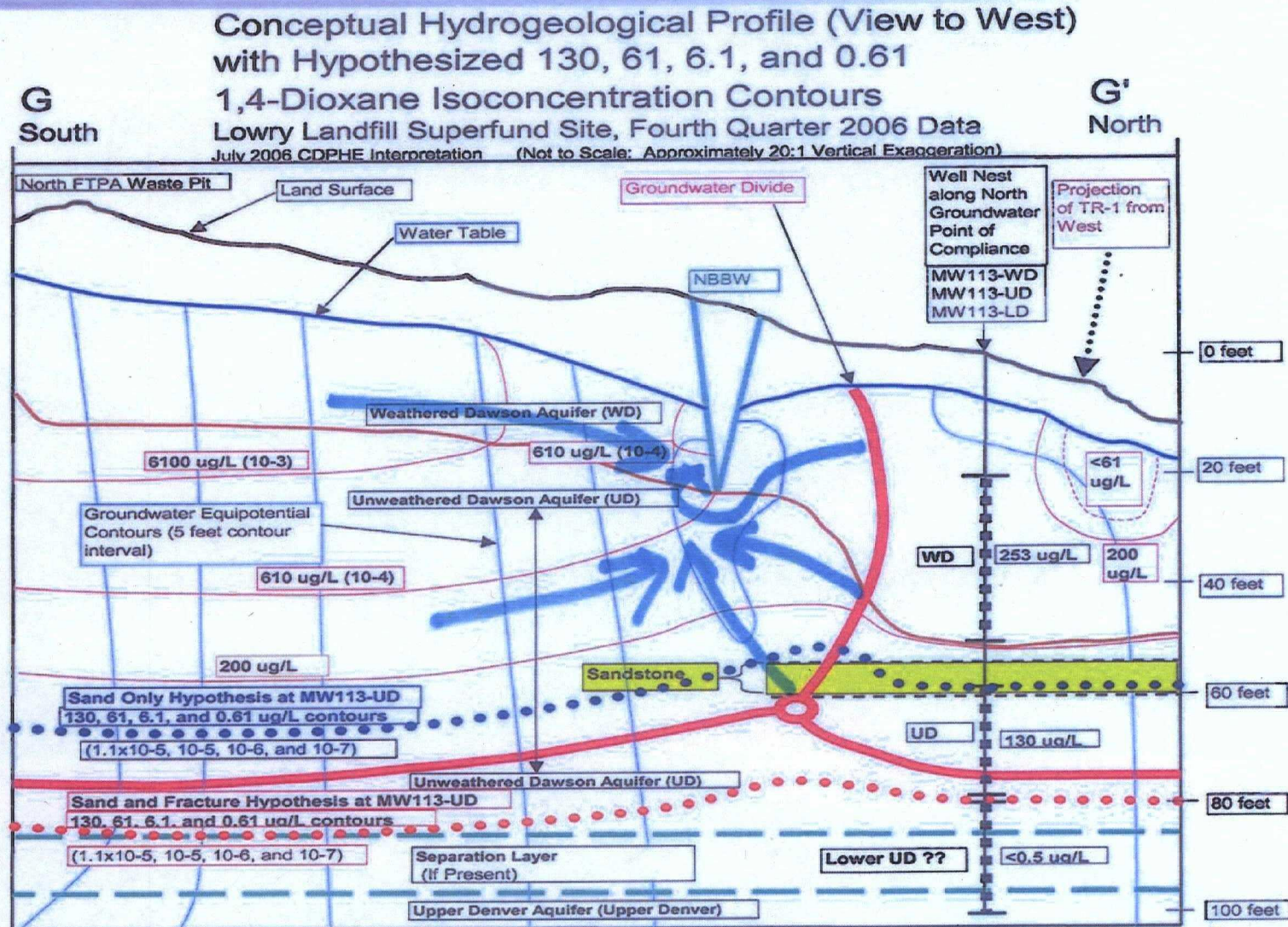
- Gravel drain on up-gradient side
- Clay barrier on down-gradient side



COPHE, 7/7/11



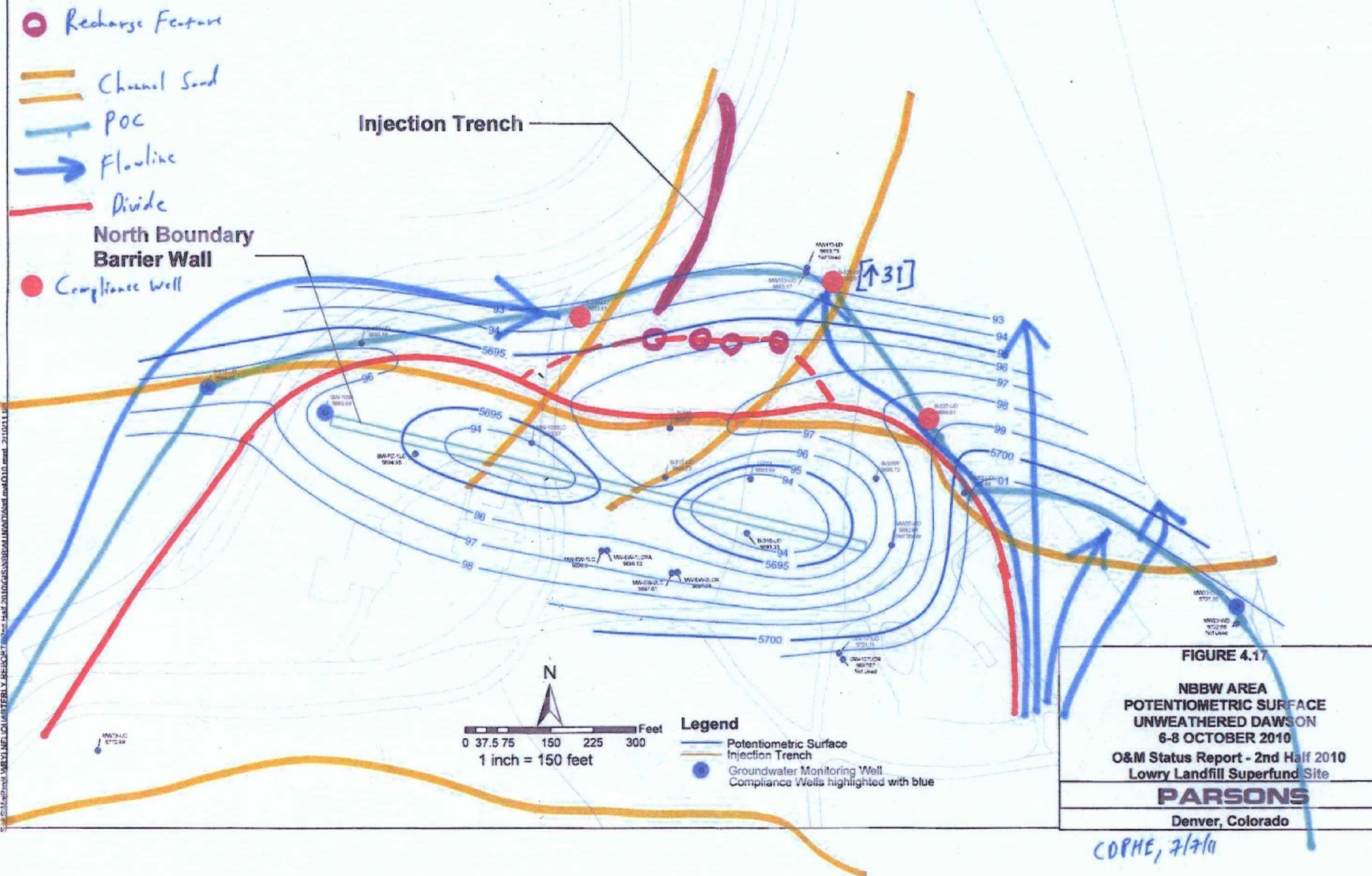
# G-G' Profile: Hypothesized 1,4-Dioxane Isoconcentration Contours



CDPHE, 7/7/11



[↑31]: Trend and 1,4-Dioxane Conc. (ug/L)





[77]: Trend and Nitrate Conc. (mg/L)  
 [23]: Trend and 1,4-Dioxane Conc. (ug/L)

- Recharge Feature
- == Channel Sand
- POC
- Flowline
- Compliance well
- Divide

Injection Trench

Anomalous Head(s)

[77]  
 [Ineff. Dep. 33]

NBBW

### Legend

- Potentiometric Surface (dashed where inferred)
- Injection Trench
- Groundwater Monitoring Well
- Compliance Wells highlighted with blue
- Groundwater Extraction Well
- Zone of Containment
- NBBW
- Injection Began November 8, 2010

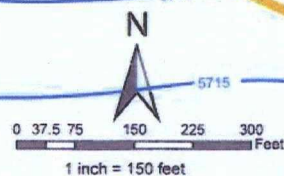
FIGURE 4.15  
 NBBW AREA  
 WEATHERED DAWSON  
 POTENTIOMETRIC SURFACE

8 OCTOBER 2010

O&M Status Report - 2nd Half 2010  
 Lowry Landfill Superfund Site

PARSONS  
 Denver, Colorado

Note: The water elevation value for the fully penetrating well when twinned by a partially penetrating piezometer was honored for contouring



CDPHE, 7/7/11